

KAREN HEPLER ROSENLOF

EDUCATION

Ph.D. 1994	University of Washington	(Atmospheric Sciences)
M.S. 1984	Colorado State University	(Atmospheric Science)
B.S. 1982	University of California at Davis	(Atmospheric Science)

EMPLOYMENT EXPERIENCE

4/99-	<u>Meteorologist</u> , Chemistry and Climate Processes Group (Acting Program Leader) Meteorological Chemistry Group (through 12/07) NOAA Aeronomy Laboratory, Boulder, Colorado (through 9/05) NOAA ESRL, Chemical Sciences Division, Boulder, Colorado (10/05-present)
6/94-4/99	<u>Research Associate</u> , CIRES, University of Colorado/NOAA Aeronomy Laboratory, Boulder, Colorado.
9/89-6/94	<u>Graduate Research Assistant</u> , Department of Atmospheric Sciences, University of Washington, Seattle, Washington (advisor: J. R. Holton).
12/84-6/89	<u>Professional Research Assistant</u> , Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, Colorado.
8/82-11/84	<u>Graduate Research and Teaching Assistant</u> , Department of Atmospheric Science, Colorado State University, Fort Collins, Colorado (advisor D. E. Stevens).
6/81-8/82	<u>Meteorologist Intern</u> , NWS, Weather Service Forecast Office, Redwood City, California.
6/80-3/81	<u>Student Trainee</u> , NWS, CA/NV River Forecast Center, Sacramento, California.
6/79-5/80	<u>Student Intern</u> , California Air Resources Board, Emissions Inventory section, Sacramento, California.

AWARDS

- NOAA Bronze Award, "for the successful demonstration of the Global Hawk Unmanned Aircraft Systems for NOAA's Climate Goal" awarded to David Fahey, Steven Ciciora, Richard McLaughlin, RuShan Gao, Karen Rosenlof, Brad Hall, and James Elkins, 2013
- NASA Group Achievement Award, MACPEX Science Team, 2012
- NASA Group Achievement Award, GloPac Science Team, 2011
- NASA Group Achievement Award, ARCTAS Science Team, 2009
- NASA Group Achievement Award, TC-4 Science Team, 2008
- NOAA Bronze Award, "for demonstrating the usefulness of unmanned aircraft systems in accomplishing NOAA's mission, including operation and research goals" awarded to James Churnside, James Elkins, David Fahey, Albin Gasiewski, Samuel Oltmans, Karen Rosenlof, and Sara Summers, 2007
- NASA Group Achievement Award, UARS Team, 2006
- NASA Group Achievement Award, CRYSTAL-FACE Science Team, 2003
- NASA Group Achievement Award, CAMEX 4 Science Team, 2002
- Clarence Leroy Meisinger Award, American Meteorological Society, 2000, "for outstanding observational and theoretical analysis of the stratospheric circulation and trace constituent transport."

- NOAA/ERL Outstanding Paper Award, 1998 and 2001
2001: Oltmans, S. J., H. Vömel, D. J. Hofmann, K. H. Rosenlof, D. Kley, 2000: The increase in stratospheric water vapor from balloonborne, frostpoint hygrometer measurements at Washington, D.C., and Boulder, Colorado *Geophys. Res. Lett.*, **2**, 3453-3457.
- 1998: Rosenlof, K. H., A. F. Tuck, K. K. Kelly, J. M. Russell III, M. P. McCormick, 1997: Hemispheric asymmetries in water vapor and inferences about transport in the lower stratosphere, *J. Geophys. Res.*, **102**, 13213-13234. (ASHOE/MAESA special section)
- NASA Group Achievement Award, POLARIS Project Team, 1997
- Travel award to attend SPARC conference in Melbourne Australia, Dec. 1996
- Travel award to attend NATO ASI, "The Stratosphere and its Role in the Climate System" in Val Morin, Quebec, Canada, Sept. 1-15, 1995
- State of Colorado Graduate Fellowship, 1983
- Henry Jastro Fellowship (U.C. Davis), 1982
- Phi Kappa Phi Honor Society, 1981

LEADERSHIP POSITIONS

- NOAA-Water Experiment, WB-57F aircraft experiment, Lead scientist, 2005
- SPARC water vapor assessment II (WAVAS II) co-leader; 2008-present
- Chair of the AMS Middle Atmosphere STAC Committee (2004-2007)
- SPARC Water Vapour Assessemnt Chapter 2 coordinating lead author, 1998-2000

SCIENCE TEAM PARTICIPATION

- Multi-aircraft experiments: TC4 (2007), SEAC4RS (2013)
- ER-2 aircraft experiments: ASHOE/MAESA (1994), POLARIS (1997), CAMEX-4 (2001)
- WB-57F aircraft experiments: WAM (1998), ACCENT I&II (1999, 2000), CRYSTAL-FACE (2002), Pre-AVE (2004), AVE (2004), AVE (2005), TCSP (2005, theory), NOAA-Water Experiment, lead scientist (2005), CR-AVE (2006), MACPEX (2011)
- NOAA UAS Flight Demonstration Project 2005
- NOAA P-3 aircraft experiment: flight planning lead ARCPAC (2008), (in conjunction with NASA ARCTAS)
- NCAR G-5 aircraft experiments: START-08 (2008), HIPPO (2009-2011)
- Satellite experiments: HALOE (1994-2002), SAGE-II (1994-1997), Aura (2008- 2011)
- Global Hawk: GloPac (2010), ATTREX(2011/2014)

ACTIVITIES & PROFESSIONAL SERVICE

- Journal reviews for JGR, JAS, J. Climate, QJRMS, ACP, Science, Nature, MWR, AOT
- Proposal reviews for NASA, NOAA, NSF, NERC (UK), NWO (Netherlands)
- Advisory Board Member, ESA SPARC Initiative (SPIN)
- Instructor; U.S. - Japan Bilateral Workshop on the Tropical Tropopause Layer: State of the Current Science and Future Observational Needs, Oct 2012
- Reviews for 2011 Office of Atmospheric and Oceanic Research (OAR) Outstanding Scientific Paper Awards
- Expert reviewer for Chapter 2 FOD and SOD, IPCC AR5
- External review panel for the SHARP Program (German stratospheric research program, in Berlin, March 2012)
- Reviewer for SPARC Data Initiative, Dec 2011
- Session co-organizer for parallel session for the WCRP 2011 meeting
- Session co-organizer for water vapor poster cluster at the WCRP 2011 meeting

- Co-Convener (with S. Davis) for special session on tropical extent at Fall AGU (2010)
- Lead Author, 2010 Ozone Assessment (Chapter 4)
- Instructor, Cargese International School, Water Vapour in the Climate System, Sept. 2009
- SPARC water vapor assessment II (WAVAS II) co-leader; 2008-present
- NOAA ESRL CSD seminar coordinator, September 2006-August 2008
- ACCRI SSWP Workshop (and proposal review committee), 2007/2008
- ICAO CAEP Impacts Workshop, Montreal, 29-31 October 2007
- Chapman Water Vapor Conference organizing committee (meeting in fall 2008)
- Chair of the AMS Middle Atmosphere STAC Committee (member 01-07, chair 04-07)
- Contributing author: 2006 Ozone Assessment
- Contributing author: 2007 IPCC AR4
- 14th AMS Middle Atmosphere Conference program committee
- Aura water vapor validation subcommittee, chair, 2005 & 2006
- Participant at the Workshop on the Impacts of Aviation on Climate Change, June 7-9, 2006, Boston, MA (listed as a contributing author on the final report)
- 13th AMS Middle Atmosphere Conference program committee, Chair (2005)
- Nominating committee appointed by the AGU Atmospheric Sciences President, 2004-2006
- Nominating committee for the AMS Bernhard Haurwitz Memorial Lecturer, 2003 - 2006
- External Review Committee for the NRL Battlespace Environments (Atmospheric Physics) Research Program (April 2003)
- Rapporteur at the Joint SPARC-IGAC Workshop on Climate-Chemistry Interactions (April 2003)
- 12th AMS Middle Atmosphere Conference program committee (2002)
- Co-Convener (with R. Friedl and M. Ross) for ACCENT special session at Fall AGU (2001)
- NOAA Outstanding Paper Awards review committee (2000)
- AMS Committee on Middle Atmosphere (2001-2007, chair 2004-2007)
- AGU Atmospheric Dynamics sub-committee member (1999-2005)
- SPARC Water Vapor Assessment, Chapter 2 coordinating lead author (1998-2000)
- NRC Panel on the Atmospheric Effects of Aviation (PAEAN) (1998-1999)
- Second Chapman Conference on Water Vapor in the Climate System program committee (1999)
- Co-organizer for the UW Dept. of Atm. Sciences Research Orientation Seminars, 1992/93
- Organizer for the UW Dept. of Atmospheric Sciences Teaching Award, 1992
- Secretary/Treasurer, CSU American Meteorological Society chapter, 1983/84
- President, Atmospheric Sciences Student Group, UC Davis, 1981/82

PROFESSIONAL SOCIETIES:

American Meteorological Society, member since 1980.

American Geophysical Union, member since 1988.

STUDENT INVOLVEMENT:

Currently serving on graduate committees for Adriana Raudzens-Bailey (CU, ATOC) and Wei Yuan (SOMAS, Stony Brook)

Served on Jeff Hicke's (CU, PAOS) and Ryan Neely's (CU, ATOC) graduate committees; served as Ryan Neely's NOAA advisor for his last year at CU

Advised Matthew Phillips, undergraduate PHASE student for 2 years.

JOURNAL PUBLICATIONS

- 1) Rosenlof, K.H., D.E. Stevens, J.R. Anderson, P.E. Ciesielski, 1986: The Walker Circulation with observed winds, a mean Hadley cell, and cumulus friction. *J. Atmos. Sci.*, **43**, 449-467.

- 2) Thomas, R.J., K.H. Rosenlof, R.T. Clancy, J.M. Zawodny, 1988: Stratospheric NO₂ over Antarctica as measured by the Solar Mesosphere Explorer during Austral spring, 1986. *J. Geophys. Res.*, **93**, 12561-12568.
- 3) Rosenlof, K. H., R. J. Thomas, 1990: Five-day mesospheric waves observed in Solar Mesosphere Explorer ozone, *J. Geophys. Res.*, **95**, 895-899.
- 4) Rosenlof, K. H., J. R. Holton, 1993: Estimates of the stratospheric residual circulation using the downward control principle. *J. Geophys. Res.*, **98**, 10465-10479
- 5) Rosenlof, K. H., 1995: The seasonal cycle of the residual mean meridional circulation in the stratosphere, *J. Geophys. Res.*, **100**, 5173-5191.
- 6) Mote, P. W., K. H. Rosenlof, J. R. Holton, R. S. Harwood, J. W. Waters, 1995: Seasonal variations of water vapor in the tropical lower stratosphere, *Geophys. Res. Letters*, **22**, 1093-1096.
- 7) Mote, P. W., K. H. Rosenlof, M. E. McIntyre, E. W. Carr, J. C. Gille, J. R. Holton, J. S. Kinnersley, H. C. Pumphrey, J. M. Russell III, J. W. Waters, 1996: An atmospheric tape recorder: the imprint of tropical tropopause temperatures on stratospheric water vapor, *J. Geophys. Res.*, **101**, 3989-4006.
- 8) Appenzeller, C., J. R. Holton, K. H. Rosenlof, 1996: Seasonal variation of mass transport across the tropopause, *J. Geophys. Res.*, **101**, 15071-15078.
- 9) Rosenlof, K. H., 1996, Summer hemisphere differences in temperature and transport in the lower stratosphere, *J. Geophys. Res.*, **101**, 19129-19136.
- 10) Fahey, D. W., S. G. Donnelly, E. R. Keim, R. S. Gao, R. C. Wamsley, L. A. Del Negro, E. L. Woodbridge, M. H. Proffitt, K. H. Rosenlof, M. K. W. Ko, D. K. Weisenstein, C. J. Scott, C. Nevison, S. Solomon, K. R. Chan, 1996: In-situ observations of NOy, O₃, and the NOy/O₃ ratio in the lower stratosphere, *Geophys. Res. Letters*, **23**, 1653-1656.
- 11) Alexander, M. J., K. H. Rosenlof, 1996: Non-stationary gravity wave forcing of the stratospheric zonal mean wind, *J. Geophys. Res.*, **101**, 23465-23474.
- 12) Tuck, A. F., D. Baumgardner, K. R. Chan, J. E. Dye, J. W. Elkins, B. L. Gary, S. J. Hovde, K. K. Kelly, M. Loewenstein, R. D. May, J. R. Podolske, M. H. Proffitt, K. H. Rosenlof, W. L. Smith, C. R. Webster, J. C. Wilson, 1997: The Brewer Dobson circulation in the light of high altitude in-situ aircraft observations, *Q. J. R. Meteorol. Soc.*, **123**, 1-69.
- 13) Rosenlof, K. H., A. F. Tuck, K. K. Kelly, J. M. Russell III, M. P. McCormick, 1997: Hemispheric asymmetries in water vapor and inferences about transport in the lower stratosphere, *J. Geophys. Res.*, **102**, 13213-13234.
- 14) Keim, E. R., M. Loewenstein, J. R. Podolske, D. W. Fahey, R. S. Gao, E. L. Woodbridge, R. C. Wamsley, S. G. Donnelly, L. A. Del Negro, C. D. Nevision, S. Solomon, K. H. Rosenlof, C. J. Scott, M. K. W. Ko, D. Weisenstein, and K. R. Chan, 1997: Measurements of the NOy-N₂O correlation in the lower stratosphere: Latitudinal and seasonal changes and model comparisons, *J. Geophys. Res.*, **102**, 13193-13212.
- 15) Gettelman, A., J. R. Holton, K. H. Rosenlof, 1997: Ozone and other trace gas mass fluxes in the lower stratosphere calculated from observational data, *J. Geophys. Res.*, **102**, 19149-59.
- 16) Donaldson, D. J., G. J. Frost, K. H. Rosenlof, A. F. Tuck, V. Vaida, 1997: Atmospheric radical production by excitation of vibrational overtones via absorption of visible light *Geophys. Res. Lett.*, **24**, 2651 -2654.
- 17) Sandor, B.J, W.G. Read, J.W. Waters, K.H. Rosenlof, 1998: Seasonal behavior of tropical to mid-latitude upper tropospheric water vapor from UARS MLS, *J. Geophys. Res.*, **103**, 25935-25947.
- 18) Herman, R. L., D. C. Scott, C. R. Webster, R. D. May, E. J. Moyer, F. J. Salawitch, Y. L. Yung, G. C. Toon, B. Sen, J. J. Margitan, S. J. Oltmans, K. H. Rosenlof, H. A. Michelsen, J. W. Elkins, 1998: Tropical entrainment timescales inferred from stratospheric N₂O and CH₄ observations, *Geophys. Res. Lett.*, **25**, 2781-2784.

- 19) Flocke, F., R. L. Herman, R. J. Salawitch, E. Atlas, C. R. Webster, S. M. Schauffler, R. A. Lueb, R. D. May, E. J. Moyer, K.H. Rosenlof, D.C. Scott, D.R. Blake, T.P. Bui, 1999: An examination of chemistry and transport processes in the tropical lower stratosphere using observations of long-lived and short-lived compounds obtained during STRAT and POLARIS, *J. Geophys. Res.*, **104**, 26625-26642.
- 20) Ray, E. A., F. L. Moore, J. W. Elkins, G. S. Dutton, D. W. Fahey, A. Andrews, K. A. Boering, H. Vömel, S. J. Oltmans, K. H. Rosenlof, P. A. Newman, 1999: Transport into the Northern Hemisphere lowermost stratosphere revealed by in-situ tracer measurements, *J. Geophys. Res.*, **104**, 26565-26580. (POLARIS special section)
- 21) Rosenlof, K. H., 1999: Estimates of the seasonal cycle of mass and ozone transport at high northern latitudes, *J. Geophys. Res.*, **104**, 26511-26523. (POLARIS special section)
- 22) Oltmans, S. J., H. Vömel, D. J. Hofmann, K. H. Rosenlof, D. Kley, 2000: The increase in stratospheric water vapor from balloonborne, frostpoint hygrometer measurements at Washington, D.C., and Boulder, Colorado *Geophys. Res. Lett.*, **2**, 3453-3457.
- 23) Rosenlof, K.H., S. J. Oltmans, D. Kley, J.M. Russell III, E-W. Chiou, W.P. Chu, D. G. Johnson, K.K. Kelly, H.A. Michelsen, G.E. Nedoluha, E.E. Remsberg, G.C. Toon, M.P. McCormick, 2001: Stratospheric water vapor increases over the past half century, *Geophys. Res. Lett.*, **28**, 1195-1199.
- 24) Rosenlof, K. H., 2002: Transport changes inferred from HALOE water and methane measurements, *J. Met. Soc. Japan*, **80**(4B), 831-848.
- 25) Gao, R-S, P. J. Popp, E. A. Ray, K. H. Rosenlof, M. Northway, D. W. Fahey, A. F. Tuck, C. R. Webster, D. Hurst, S. Schauffler, H. Jost, T. P. Bui, 2002: The role of NO_y as a diagnostic of small-scale mixing in a denitrified polar vortex, *J. Geophys. Res.*, **107**, No. D24, 4794, doi:10.1029/2002JD002332.
- 26) Alexander, M. J., K. H. Rosenlof, 2003: Gravity wave forcing in the stratosphere: Observational constraints from UARS and implications for parameterization in global models, *J. Geophys. Res.*, **108**, No. D19, 4597, doi:10.1029/2003JD003373.
- 27) Richard, E. C., K. C. Aikin, E. A. Ray, K. H. Rosenlof, T. L. Thompson, A. Weinheimer, D. Montzka, D. Knapp, B. Ridley, A. Gettelman, 2003: Large-scale equatorward transport of ozone in the subtropical lower stratosphere, *J. Geophys. Res.*, **108**, No. D23, 4714, doi: 10.1029/2003JD3003884.
- 28) Ray, E. A., K. H. Rosenlof, E. Richard, D. Parrish and R. Jakoubek, 2004: Distributions of ozone in the region of the subtropical jet: An analysis of *in situ* aircraft measurements, *J. Geophys. Res.*, 10.1029/2003JD004143.
- 29) Rosenlof, K. H., 2003: How water enters the stratosphere, *Science*, **302**, 1691-1692.
- 30) Gao, R. S., P. J. Popp, D. W. Fahey, T. P. Marcy, R. L. Herman, E. M. Weinstock, D. G. Baumgardner, T. J. Garrett, K. H. Rosenlof, T. L. Thompson, P. T. Bui, B. A. Ridley, S. C. Wofsy, O. B. Toon, M. A. Tolbert, B. Kärcher, Th. Peter, P. K. Hudson, A. J. Weinheimer, A. J. Heymsfield, 2004: Evidence that nitric acid increases relative humidity in low-temperature cirrus clouds, *Science*, **303**, 516-520.
- 31) Marcy, T. P., D. W. Fahey, R. S. Gao, E. C. Richard, T. L. Thompson, K. H. Rosenlof, E. A. Ray, R. J. Salawitch, C. S. Atherton, D. J. Bergmann, B. A. Ridley, A. J. Weinheimer, M. Loewenstein, E. M. Weinstock and M. J. Mahoney, 2004: Quantifying stratospheric ozone in the upper troposphere using in situ measurements of HCl, *Science*, **304**, 261-265.
- 32) Ray, E.A, K.H. Rosenlof, E. C. Richard, P. K. Hudson, D. J Cziczo, M. Loewenstein, H. J. Jost, J. Lopez, B. Ridley, A. Weinheimer, D. Montzka, D. Knapp, S.C. Wofsy, B.C. Daube, C. Gerbig, I. Xueref, R.L. Herman, 2004: Evidence of the effect of summertime midlatitude convection on the subtropical lower stratosphere: An analysis of tracer measurements from the CRYSTAL-FACE mission, *J. Geophys. Res.*, **109**, D18304, doi:10.1029/2004JD004655.

- 33) Randel, W. J., F. Wu, S. J. Oltmans , K. Rosenlof, G. E. Nedoluha, 2004: Interannual Changes of Stratospheric Water Vapor and Correlations with Tropical Tropopause Temperatures. *J. Atmos. Sci.*, **61**, 2133–2148.
- 34) Gettelman A, E. M. Weinstock, E. J. Fetzer, F. W. Irion, A. Eldering, E. C. Richard, K. H. Rosenlof, T. L. Thompson, J. V. Pittman, C. R. Webster, R. L. Herman, 2004: Validation of Aqua satellite data in the upper troposphere and lower stratosphere with *in situ* instruments, *Geophys. Res. Lett.*, **31**, L22107, doi:10.1029/2004GL020730.
- 35) Jensen E.J., J.B. Smith, L. Pfister, J.V. Pittman, E.M. Weinstock, D.S. Sayres, R.L. Herman, R.F. Troy, K.H. Rosenlof, T.L. Thompson, A.M. Fridlind, P.K. Hudson, D.J. Cziczo, A.J. Heymsfield, C. Schmitt, J.C. Wilson , 2005: Ice supersaturations exceeding 100% at the cold tropical tropopause: implications for cirrus formation and dehydration, *Atm. Chem. Phys.* **5**, 851-862.
- 36) Popp P.J., T.P. Marcy, E.J. Jensen, B. Karcher, D.W. Fahey, R-S. Gao, T.L. Thompson, K.H. Rosenlof, E.C. Richard, R.L. Herman, E.M. Weinstock, J.B. Smith, R.D. May, H. Voemel, J.C. Wilson, A.J. Heymsfield , M.J. Mahoney, A.M. Thompson, 2006: The observation of nitric acid-containing particles in the tropical lower stratosphere, *Atm. Chem. Phys.*, **6**, 601-611.
- 37) Gao, R.-S, D. W. Fahey, P. J. Popp, T. P. Marcy, R. L. Herman, E. M. Weinstock, J. B. Smith, D. S. Sayres, J. V. Pittman, K. H. Rosenlof, T. L. Thompson, P. T. Bui, D. G. Baumgardner, B. E. Anderson, G. Kok, A. J. Weinheimer, 2006: Measurements of relative humidity in a persistent contrail, *Atm. Environ.*, **40**, 1590-1600.
- 38) Richard, E.C., A. F. Tuck, K.C. Aikin, K.K. Kelly, R.L. Herman, S.J. Hovde, K.H. Rosenlof, T.L. Thompson, E.A. Ray, 2006: High-resolution airborne profiles of CH₄, O₃ and water vapor near tropical Central America in late January to early February 2004, *J. Geophys. Res.*, **111**, D13304, doi:10.1029/2005JD006513.
- 39) Schwarz, J.P., R-S Gao, D.W. Fahey, D.S. Thompson, L.A. Watts, J.C. Wilson, J.M. Reeves, M. Darbeheshti, D.G. Baumgardner, G.G. Kok, S.H Chung, M. Schulz, J. Hendricks, A. Lauer, B. Karcher, J.G. Slowik, K.H. Rosenlof, T.L. Thompson, A.O. Langford, M. Loewenstein, K.C. Aikin, 2006: Single-particle measurements of midlatitude black carbon and light-scattering aerosols from the boundary layer to the lower stratosphere, *J. Geophys. Res.*, **111**, D16207, doi:10.1029/2006JD007076.
- 40) Fahey, D.W., J.H. Churnside, J.W. Elkins, A.J. Gasiewski, K.H. Rosenlof, S. Summers, M. Aslaksen, T.A. Jacobs, J. D. Sellars, C. D. Jennison, L. C. Freudinger, and M. Cooper, 2006: Altair Unmanned Aircraft system achieved demonstration goals, *EOS, Transactions, American Geophysical Union*, **87**, 20, (May), Page 197 & 201.
- 41) Ray, E.A., and K. H. Rosenlof, 2007: Hydration of the upper troposphere by intense tropical storms, *J. Geophys. Res.*, **112**, Issue D12, D12311, doi: 10.1029/2006JD008009.
- 42) Thorton, B., D.W. Toohey, A.F. Tuck, J.W. Elkins, S.J. Hovde, M.J. Mahoney, E.C. Richards, K.H. Rosenlof, T.L. Thompson, K.K. Kelly and J.C. Wilson, 2007: Chlorine Activation near the Midlatitude Tropopause, *J. Geophys. Res.*, **112**, D18306, doi:10.1029/2006JD007640.
- 43) Read, W.G., A. Lambert, J. Bacmeister, R.E. Coeld, L.E. Christensen, D.T. Cuddy, W.H. Daer, B.J. Drouin, E. Fetzer, L. Froidevaux, R. Fuller, R. Herman, R.F. Jarnot, J.H. Jiang, Y.B. Jiang, K. Kelly, B.W. Knosp, L.J. Kovalenko, N.J. Livesey, H.-C. Liu, G.L. Manney, H.M. Pickett, H.C. Pumphrey, K.H. Rosenlof, X. Sabounchi, M.L. Santee, M. Schwartz, W.V. Snyder, P.C. Stek, H. Su, L L. Takacs, R.P. Thurstans, H. Vömel, P.A. Wagner, J.W. Waters, C.R. Webster, E.M. Weinstock, D.L.Wu, 2007: Aura Microwave Limb Sounder Upper Tropospheric and Lower Stratospheric H₂O and RH Validation, *J. Geophys. Res.*, **112**, D24S35, doi:10.1029/2007JD008752.
- 44) Rosenlof, K.H. and G. C. Reid, 2008: Trends in the temperature and water-vapor content of the tropical lower stratosphere: The sea-surface connection, *J. Geophys. Res.*, **113**, D06107, doi:10.1029/2007JD009109.
- 45) Rosenlof, K.H. and G. C. Reid, 2009: Reply to comment by John R. Lanzante on "Trends in the temperature and water vapor content of the tropical lower stratosphere: Sea surface connection", *J. Geophys. Res.*, **114**, D12105, doi:10.1029/2008JD011265.

- 46) Murphy, D.M., S. Solomon, R.W. Portmann, K.H. Rosenlof, P.M Forster, T. Wong, 2009: An observationally based energy balance for the Earth since 1950, *J. Geophys. Res.*, **114**, D17107, doi:10.1029/2009JD012105.
- 47) Dall'Amico, M, P.A. Stott, A.A. Scaife, L.J. Gray, K.H. Rosenlof, A.Y. Karpechko, 2010: Impact of stratospheric variability on tropospheric climate change, *Climate Dynamics*, **34**, 399-417, doi:10.1007/s00382-009-0580-1.
- 48) Dall'Amico, M., L.J. Gray, K.H. Rosenlof, A.A. Scaife, K.P. Shine, P.A. Stott, 2010: Stratospheric temperature trends: impact of ozone variability and the QBO, *Climate Dynamics*, **34**, 381-398, doi:10.1007/s00382-009-0604-x.
- 49) Karpechko, A.Y., N. P. Gillett, B. Hassler, K. H. Rosenlof, and E. Rozanov, 2010: Objective assessment of O₃ in chemistry-climate model simulations, *Atm. Chem. Phys.*, **10**, 1385-1400.
- 50) Solomon, S., K. H. Rosenlof, R. Portmann, J.Daniel, S. Davis, T. Sanford, G-K Plattner, 2010: Contributions of Stratospheric Water Vapor Changes to Decadal Variations in the Rate of Global Warming, published on Science Express Jan 28, 2010, in Science Mar 5, *Science*, **327**, 1219-1223.
- 51) Toon, O.B., D. Starr, E. Jensen, P. Newman, S. Platnick, M. Schoeberl, P. Wennberg, S. Wofsy, M. Kurylo, H. Maring, K. Jucks, M.Craig, M. Vasques, L. Pfister, K. Rosenlof, H. Selkirk, P. Colarco, S.R. Kawa, G. Mace, P. Minnis, K. Pickering, 2010: Planning and Implementation of the Tropical Composition, Cloud and Climate Coupling Experiment (TC4), *J. Geophys. Res.*, **115**, D00J04, doi:10.1029/2009JD013073.
- 52) Pfister, L, H. B. Selkirk, D.O. Starr, K.H. Rosenlof, P. A. Newman, 2010: A Meteorological Overview of the TC4 mission, *J. Geophys. Res.*, **115**, D00J12, doi:10.1029/2009JD013316
- 53) Petropavlovskikh, I., E. Ray, S.M. Davis, K. H. Rosenlof, G. Manney, R. Shetter, S. R. Hall, K. Ullman, L. Pfister, J. W. Hair, M. Fenn, M. Avery, and A. M. Thompson, 2010: Low ozone bubbles observed in the tropical tropopause layer during the TC4 campaign in 2007, *J. Geophys. Res.*, **115**, D00j16, doi:10.1029/2009JD012804.
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- a) Rex, M., I. Wohltmann, T. Ridder, R. Lehmann1, R-S Gao, K Rosenlof, P Wennberg, D Weisenstein, J Notholt, K Krüger, V Mohr, S Tegtmeier, A Tropical West Pacific “OH Hole” and Implications for Stratospheric Composition, submitted to Science, Jan 2013
- b) Dessler A.E., M.R. Schoeberl, T. Wang, S.M. Davis, K.H. Rosenlof, J.-P. Vernier, Understanding past and predicting future variations of stratospheric water vapor, submitted to PNAS, 2013.
- c) Rosenlof, K.H., and D.F. Hurst, Stratospheric Water Vapor, in *State of the Climate in 2012,,Bulletin of the American Meteorological Society*, in press.
- d) Gao, R. S., K. H. Rosenlof, D. W. Fahey, P. O. Wennberg, E. J. Hintsa, and T. F. Hanisco, OH in the tropical upper troposphere and its relationships to solar radiation and reactive nitrogen, submitted to GRL, July 2013
- e) Neely III, R. R., P. Yu, K. H. Rosenlof, O. B. Toon, S. Solomon, J. S. Daniel, H. L. Miller, The Contribution of Anthropogenic SO₂ Emissions to the Asian Tropopause Aerosol Layer, submitted to JGR, July 2013

UNREVIEWED PUBLICATIONS

- 1) Rosenlof, K. H., 1984: The sensitivity of the Walker Circulation to different basic states in a linear model. Master's Thesis, Dept. of Atm. Sci., Colorado State University.
- 2) Rosenlof, K. H. and D. E. Stevens, 1984: The sensitivity of the Walker Circulation to different basic states in a linear model. Atmos. Sci. paper #385, CSU Dept. of Atm. Sci., Fort Collins, Co.
- 3) Rosenlof, K. H., 1994: Mass transport in the stratosphere examined using the transformed Eulerian-mean residual circulation. Doctoral Dissertation, Dept. of Atm. Sci., University of Washington.
- 4) Waters, J. W, S. Dorling, J-H Kim, M. Morrey, and K. Rosenlof, 1997, The Upper Atmosphere Research Satellite (UARS), in The Stratosphere and its Role in the Climate System, G. Brasseur, editor, NATO ASI Series I: Global Environmental Change, Vol. 54, Springer-Verlag, Berlin Heidelberg, 345-365.
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NONSCIENTIFIC PUBLICATIONS

- 1) Rosenlof, Crutzen, Fehsenfeld, Ennis, Obituary for George C. Reid (1929-2011), EOS, Volume 92, Number 27, 13 September 2011 pg 307.
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PRESENTATIONS (Invited only)

- 25) Rosenlof, K. H., A. F. Tuck, K. K. Kelly, S. J. Oltmans, H. Vömel , J. M. Russell, M. P. McCormick, R. D. May, Water vapor trends in the lower stratosphere, Spring meeting of the American Geophysical Union, May 26-29, 1998, Boston, Mass.
- 28) Rosenlof, K. H., Water vapor in the upper troposphere and lower stratosphere: A comparison of recent satellite, aircraft and balloon measurements, SPARC (Stratospheric Processes and Their Role in Climate) Workshop on UTLS Water Vapor, August 26-28, 1998, Boulder, Co.
- 31) Rosenlof, K. H., Water vapour trends in the lower stratosphere: What are the dynamical implications?, International Union of Geodesy and Geophysics, XXII General Assembly, July 18-30, 1999, Birmingham, England, UK.
- 32) Rosenlof, K. H., Water vapor trends in the lower stratosphere, Chapman Conference on Water Vapor in the Climate System, October 12-15, 1999, Potomac, Maryland.
- 37) Rosenlof, K.H., Long-term stratospheric water changes deduced from multiple sources: What does this imply about tropical troposphere-stratosphere transport? workshop on “Coupling of the Troposphere and Stratosphere by Dynamical, Radiative and Chemical Processes”, March 13-17, 2001, Kyoto, Japan.
- 38) Rosenlof. K.H., Global structure and transport related to stratospheric water vapor observations. SPARC (Stratospheric Processes and Their Role in Climate) tropopause workshop, April 17-21, 2001, Bad Tölz, Germany.
- 39) Rosenlof, K. H., Global Transport Features Deduced from Stratospheric Water Vapor Observations, Gordon Conference on Atmospheric Chemistry, Salve Regina University, June 17-22, 2001, Newport, RI.
- 40) Rosenlof, K. H., J. M. Russell III, J. Anderson, HALOE Long-term Observations of Ozone and Related Gases, International Geoscience and Remote Sensing Symposium (IGARSS 2001), July 9-13, 2001, Sydney, Australia.
- 56) Rosenlof, K. H., Changes in tropical upwelling: A possible cause for changes in stratospheric water vapor, International Union of Geodesy and Geophysics, XXIII General Assembly, June 30-July 11, 2003, Sapporo, Japan.
- 65) Rosenlof, K. H., Water vapor observations during the Jan 2004 Pre-AVE WB57-F Aircraft Experiment based in Costa Rica, Presentation at the SOWER meeting, 10-15 July 2004, San Cristóbal, Ecuador.
- 67) Rosenlof, K. H., Changes in Stratospheric Water Vapor, Presentation at the SPARC 3rd General Assembly, 1-6 August 2004, Victoria, B.C., Canada.
- 69) Rosenlof, K. H., Large-scale circulation impacts on the UT/LS, Presentation at the SPARC-IGAC Workshop on Processes governing the chemical composition of the mid-latitude UTLS, May 18-20, 2005, Mainz, Germany
- 72) Rosenlof K. H., Changes in stratospheric water vapor: Observations, uncertainties and possible mechanisms, presentation at the NERC UTLS OZONE and CWVC Workshop on Water Vapour in the UTLS, July 5-7, 2005, Lancaster, UK.
- 73) Rosenlof, K. H., Changes in stratospheric water vapor, Presentation at IAMAS 2005, August 2-11, 2005, Beijing, China
- 79) Rosenlof, K. H., Variability in stratospheric water vapor, Presentation at the James Holton Symposium, American Meteorological Society Annual Meeting, Jan 29 - Feb 2, 2006, Atlanta, Georgia.
- 88) Rosenlof, K.H., Long-term trends in temperature and water vapour in the tropical lower stratosphere, Reunion Island International Symposium, 5-9 November, 2007, Hermitage, Saint-Gilles les Bains, Reunion Island

- 119) Rosenlof, K.H., Satellite based zonally averaged time series of stratospheric water vapor (SWOOSH), PMC Trends Workshop, LASP, University of Colorado, May 3-4, 2012,
- 120) Rosenlof, K.H., The Stratospheric Mean Meridional Circulation as Diagnosed from Reanalyses, SPARC Data Assimilation Workshop, Jun 11-13, 2012, Socorro, NM,
- 123) Rosenlof, K.H., In-Situ Aircraft Observations, U.S. - Japan Bilateral Workshop on the Tropical Tropopause Layer, Oct 15-19, 2012, East-West Center, University of Hawai'i at Manoa (Honolulu, Hawai'i)
- 126) Rosenlof, K.H., Links between the stratospheric mean meridional circulation, water, ozone and climate, WCRP Regional Workshop on Stratosphere-Troposphere Processes and their Role in Climate, Kyoto University, Kyoto, Japan, April 1-3, 2013.
- 127) Rosenlof, K.H., Stratospheric Water Vapor: Trends and Climate Impacts, 535st International Wilhelm and Else Heraeus Seminar: Water Vapor and Ice in the Atmosphere, Bad Honnef / Bonn, Germany, 10 - 14 June 2013 .

SEMINARS

- 1) Feb. 7, 1996, Lecture on Stratosphere-Troposphere exchange in A. R. Ravishankara's graduate class in atmospheric chemistry, University of Colorado, Boulder, Colorado.
- 2) April 4 1996, "Summer Hemisphere Differences in Temperature and Transport in the Lower Stratosphere", Geophysical Fluid Dynamics Laboratory, Princeton, New Jersey,
- 3) Nov. 5, 1996, "Hemispheric asymmetries in water vapor and inferences about transport in the lower stratosphere", NOAA Aeronomy Laboratory Seminar, Boulder, Colorado.
- 4) Apr. 17, 1997, "Mass Transport in the Lower Stratosphere Inferred from Water Vapor Measurements", Colorado State University Department of Atmospheric Science Seminar, Fort Collins, CO
- 5) Oct. 24, 1997, "Tropical-Midlatitude Transport in the Lower Stratosphere", SOWER/Pacific Workshop, Hitachi-Naka City, Japan.
- 6) Dec 8, 2000 Stratospheric water vapor trends and associated changes in the mean meridional circulation, NOAA Aeronomy Laboratory Seminar, Boulder, CO
- 7) Feb 15, 2001, Trends in Stratospheric Water Vapor: Observations and Possible Causes, NOAA GFDL Seminar, Princeton, NJ.
- 8) Feb 16, 2001, A Possible Expansion of the Tropical Tropopause Region over the Past 20 Years, NOAA GFDL Seminar, Princeton, NJ.
- 9) Jan 27, 2004. Pre-AVE Science Overview, Short Course on Airborne Instrumentation, National University of Costa Rica.
- 10) Feb 23, 2004, Changes in tropical upwelling: a possible cause for changes in stratospheric water vapor, NCAR ACD Seminar.
- 11) Jul 9, 2005, Changes in stratospheric water vapour, Reading University, Reading, UK
- 12) Sep 27, 2006, Water vapor trends, Strat-Hour seminar, Reading University, Reading, UK
- 13) May 2 2008, Changes in the temperature and water vapor content of the tropical lower stratosphere: A possible sea-surface connection, ATOC seminar, University of Colorado, Boulder, CO
- 14) Feb 17, 2010, The stratospheric residual circulation, lecture in the Middle Atmosphere Dynamics class, instructor Thomas Birner, Colorado State University, Fort Collins, CO.
- 15) Nov 12, 2010, Nov. 12, 2010, Stratospheric circulation changes and their relation to species distributions, ATOC/LASP seminar, University of Colorado, Boulder, CO.
- 16) April 19, 2012, The stratospheric mean meridional circulation and its relation to water, ozone and climate, Colorado State University Atmospheric Science Department seminar: part of the CSU Atmospheric Sciences 50th anniversary seminar series.